

SUSTAINABLE MOBILITY FOR ALL: CLIMATE NEUTRAL LIQUID FUELS

Sustainable Fuels 2050 Vision



EXECUTIVE SUMMARY

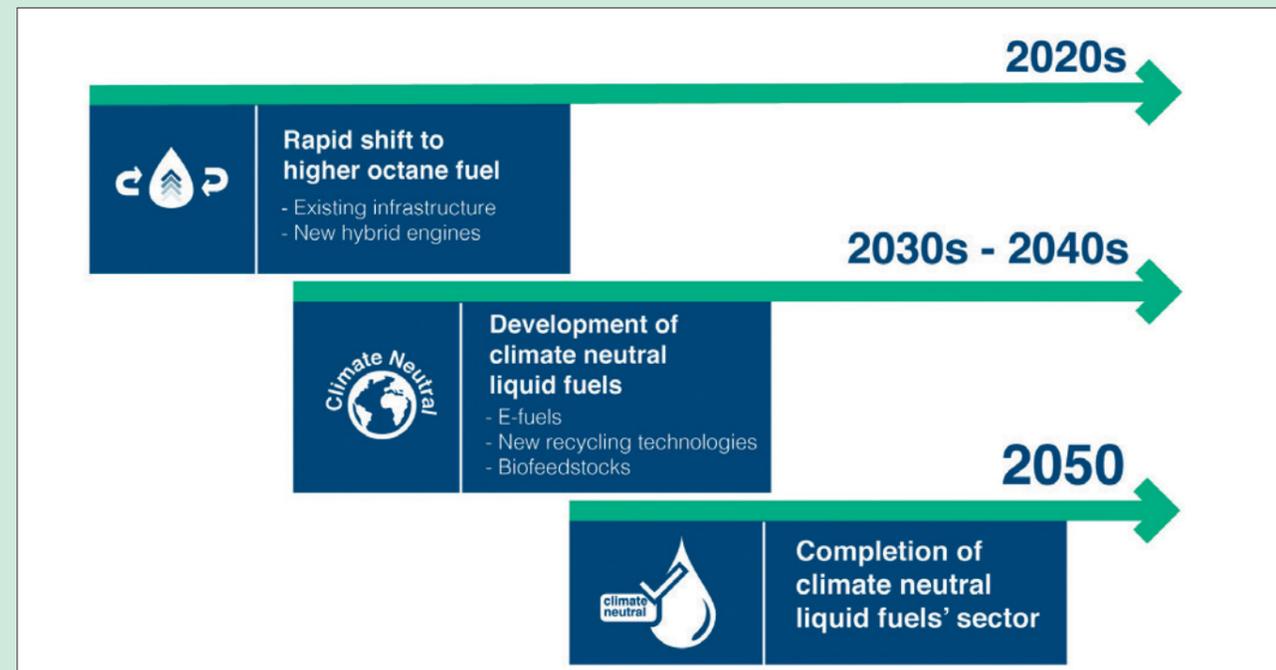
We, the fuel ethers industry, are fully aware of the importance of reducing the environmental footprint of the overall automotive and fuel industries. Transport currently accounts for almost a quarter of Europe's greenhouse gas emissions, a percentage which is rising. We share the European Union's objective of achieving climate neutrality in Europe by 2050.

Our challenge is to chart a sustainable path for transport that protects the environment while preserving the right of every European to enjoy affordable mobility.

We see a world in 2050 where climate neutral liquid fuels and electricity work together in a sustainable, affordable mobility system. The chemical and automotive industry are key to lay the foundation of a successful European future. Solutions such as high-octane fuels, advanced biofuels, 100% bio-ethers, bio-naphtha / biomass or waste to chemicals and e-fuels are some of the examples of a range of potential technical solutions.

Fuel ethers can facilitate the rapid shift to higher octane fuel, which will have an immediate and positive impact on air quality in Europe's cities and CO₂ emissions from the existing car fleet.

By 2050, climate neutral fuels can be blended seamlessly into the liquid fuel mix while being compatible with existing and future engine technologies. We can help European governments fully achieve the goal of climate neutrality swiftly, while ensuring a socially fair transition for Europe's vulnerable citizens.



THE CHALLENGE WE SHARE: A CLIMATE NEUTRAL ECONOMY BY 2050

As an industry, we support the Paris Agreement and share the European Union's objective of achieving climate neutrality in Europe by 2050. In order to respond to the climate challenge, governments, industry and civil society need to work together to deliver for Europe and demonstrate leadership for the world. We are committed to this goal.

A climate neutral Europe will mean the wholesale transformation of our economy, society and industry. To succeed, while maintaining public support, the change needs to be fair, bearable and viable. It needs to ensure that Europe preserves its leadership position in 2050, technologically, economically and environmentally. The European Green Deal recognises the magnitude of the multiple challenges facing us. It is rallying cry for all sectors, including our industry, to make their **contribution to the sustainable future of Europe**, for the benefit of future generations.

In the mobility sector, full electrification of road transport alone may require a higher level of social and economic change than if it is complemented by other technologies. Therefore, when used in combination with electric vehicle (EV) technology, **we consider liquid fuels like bio- and e-fuels as a vital tool of indirect utilisation of electricity.** E-fuels, for instance, provide a high-density method of storing renewable electricity for later use in transport. We should continue to benefit from existing competitive European Strategic Value Chains, such as the automotive, refining and petrochemicals industries.

As an industry, we support the idea of a variety of energy carriers for the transportation sector. Public acceptance of the transition and the political viability of the European Green Deal will benefit from this approach, which involves lower capital spending on new infrastructure and less dependency on a single energy carrier.

Our challenge is to chart a sustainable path for transport; whether on land, by sea or by air; whether for goods or for people. This path must **protect the environment while preserving the right of every European to enjoy affordable transport** wherever they are in Europe. European citizens must be able to access and benefit from our internal market in a cost-effective and sustainable way. The path should **ensure Europe retains its leadership on fuel quality and air quality**, support the sector coupling of innovation drivers in chemicals and refining. It should also provide us with the skills base to compete in the global economy of the 21st century.

Finally, the path must maintain European resilience and policy coherence while enabling solutions that work most effectively for the benefit of all European citizens.

OUR VISION OF THE FUTURE: LIFECYCLE CLIMATE NEUTRALITY

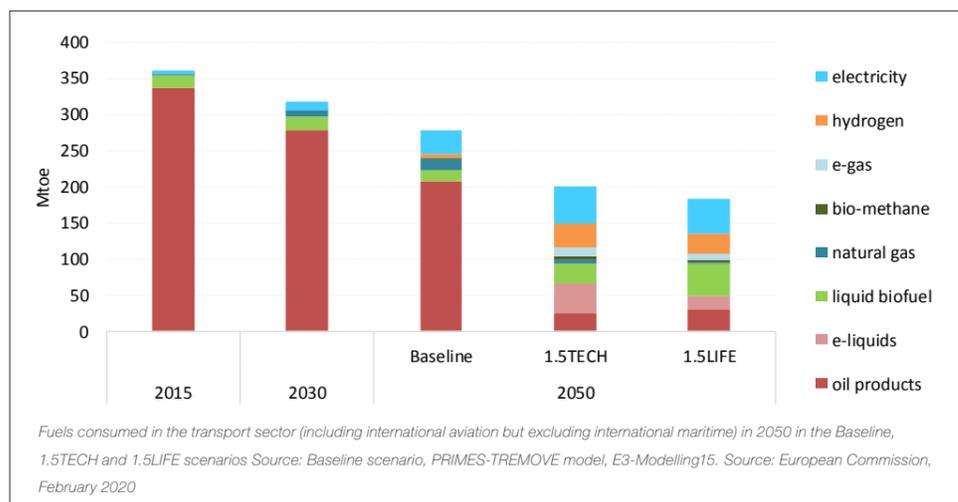
In line with the wider vision of the chemicals and refining sectors of which we are a part, **we see a world in 2050 where climate neutral liquid fuels and climate neutral electricity work together to provide affordable, fair and sustainable mobility systems** across all modes of transport on a well-to-wheel, lifecycle assessment basis.

Highly efficient hybrid engines with climate neutral liquid fuels complement fully electric vehicles in road transport, ensuring those who live in rural areas or need the range that liquid fuels offer are included rather than left behind. As early as the 2020s, **a rapid shift to higher octane fuel** using existing infrastructure and new hybrid engines brought sustainable transport to the mass consumer market. It had an **immediate and positive impact on air quality in Europe's cities** and CO₂ emissions from the existing car fleet, while limiting of job losses in the European automotive value chain. It demonstrated the benefits of the European Green Deal to citizens across the continent. It provided the political space for continued climate action into the 2030s as new electricity infrastructure spending took root and innovation in liquid fuel technology spilled-over into aviation and marine fuels.

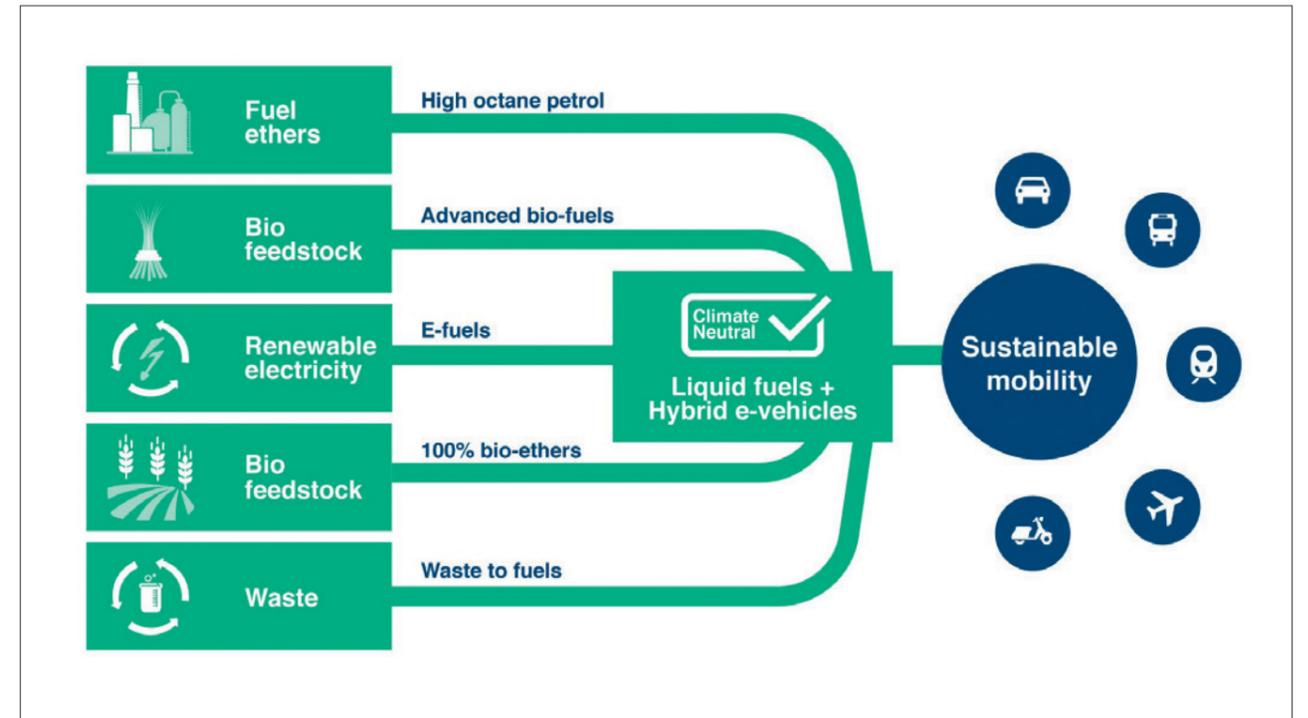
As the 2030s and 2040s progressed, **European solutions were adopted** across Africa and parts of Asia as other regions, sometimes without extensive electricity networks, sought to find a cost-effective route to sustainable mobility. In Europe, **our industry continued to invest** on the basis of a shared destination of climate neutral liquid fuels by 2050, with widespread adoption of e-fuels supplying a storage solution for excess renewable electricity, creating a coupling of the electricity and fuels sectors¹. New recycling technologies and the widespread adoption of bio-feedstocks placed the sustainable fuels industry at the nexus between the emergent European circular and bio-based economies.

The choices made by European policymakers and the innovation created by industry unleashed a new integrated, sustainable industrial base. It delivered climate neutral liquid fuels, an innovation-rich sector of a climate neutral economy aligned with the United Nations Sustainable Development Goals, and **positioned Europe at the forefront of a reshaped global industry.**

¹. DEHEMA, FutureCamp für den VCI. (2019). Roadmap Chemie 2050: Auf dem Weg zu einer treibhausgasneutralen chemischen Industrie in Deutschland. <https://www.vci.de/vci/downloads-vci/publikation/2019-10-09-studie-roadmap-chemie-2050-treibhausgasneutralitaet.pdf>



HOW WILL WE GET TO THIS VISION OF THE FUTURE?



The great thing about the future is that we can still shape it. We are convinced that the **chemical and automotive industry are key to lay the foundation of a successful European future.**

With the know-how of sector leading engineers and the vision of decision-makers, we believe that Europe can lead the world on the journey to climate neutral liquid fuels.

The chemical sector believes that by 2050, it will be able to **reduce its own greenhouse gas (GHG) emissions by a further 50% compared to current levels.** This will require the right framework conditions and all technical solutions, including changes to the feedstock and to how we process and use fuels. Solutions such as high-octane fuels, advanced biofuels, e-fuels, 100% bio-ethers, bio-naphtha / biomass or waste to chemicals are some of the examples of a range of potential technical solutions that could help industry and society to reach 2050 climate goals.

WHERE CAN WE BRING SOLUTIONS?

Sustainable fuels leverage solutions born in the chemical industry to make liquid fuels steadily cleaner, cost-effective and more efficient, but also more versatile. There are many circumstances under which **liquid fuels** are needed, and they **can be made as climate-neutral as battery-electric technology**. Just as renewable energy is being progressively increased in the energy mix, so climate neutral fuels can be blended seamlessly into the liquid fuel mix and be compatible with existing and future engine technologies, including hybrid.

Sustainable fuels' unique strength is their potential to enable technological advancements in climate neutral hybrid technology through increased efficiency or lower lifecycle emissions, as well as utilising clean energy and emerging technology to produce climate neutral e-fuels. They deliver to European policymakers a much wider array of options to use in the pursuit of a climate neutral economy. The table below showcases some of the potential solutions that sustainable fuels make possible.

The COVID-19 crisis has revealed that the availability of critical goods during a crisis relies on secure strategic supply chains and sufficient storage capacity, while maintaining domestic production. It has further demonstrated the challenges of delivering essential goods at an affordable price to EU citizens in a globalized world. Therefore, in addition to security of supply, adequate storage capacity of critical goods and products needs to be in place. **Sustainable fuels can play an important role by enabling the storage of an enormous amount of clean energy at a local level.** According to studies², both agroforestry and the Renewable and Recycled Carbon Fuels (RRCF) industry are ready to produce the feedstocks, (biomass) or source (waste), as well as the technologies, systems and components needed by the industry along the entire value chain. Thus, sustainable fuels can safeguard Europe's energy supply while delivering sustainable and affordable energy to EU citizens.

2. Security of supply, strategic storage and Covid19: Which lessons learnt for renewable and recycled carbon fuels, and their future role in decarbonizing transport?, David Chiaramonti & Kyriakos Maniatis, Applied Energy, August 2020. <https://www.sciencedirect.com/science/article/abs/pii/S0306261920307285?via%3Dihub>

WHAT ARE WE ASKING FOR?

Sustainable Fuels wants to work with all stakeholders to deliver on this vision. In order for Europe to achieve a carbon-neutral target in 2050, **we need a mix of solutions:** electric vehicles, carbon neutral liquid fuels, hybrid options, e-/bio-based fuel ethers, as well as changes to how we produce and use these fuels. **The pathway is quite clear**, although some of technological solutions need further development or scaling up.

In line with Cefic's Mid-Century Vision, we can help European governments and regulators fully achieve the goal of climate neutrality, ensure a socially fair transition for those most affected by the changes, and accelerate the pace of change.

As such, we are reaching out to:

- Find a common understanding with European policymakers that by 2050, climate neutral liquid fuels will be a key enabler of sustainable mobility as part of the European Green Deal;

- **Work with policymakers to identify and enact policies** that enable the deployment of climate neutral liquid fuels by 2050, starting with the measures identified in the European Green Deal Communication:

- over a lifecycle assessment, transport should become drastically less polluting, especially in cities,
- more stringent air pollution standards should be introduced for combustion-engine vehicles;

- **Collaborate** with the automotive industry, parts' suppliers, refiners, chemicals and agricultural sectors to develop and promote solutions for road transport;

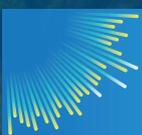
- **Begin discussions with interested parties from the aviation and marine transport sectors** about how Sustainable Fuels can contribute to the achievement of climate neutral liquid fuels for their modes of transport;

- **Support research and research networks** that further improve our understanding of the technologies available now and in the future to deliver climate neutral liquid fuels.

SOLUTIONS ENABLED BY SUSTAINABLE FUELS

- Increased range of adaptive technology pathways and a more flexible road transport system that work for all, providing better travel range whilst ensuring sustainability
- Rapid lowering of emissions in a cost-efficient manner
- Cost-effective and practical methods of storing energy from renewables
- Preservation of the resilience of Europe's energy supply
- Advancements in sustainable hybrid fuel technology building on existing industrial base and applications
- Continued utilisation of chemical waste as the feedstock for fuel ethers





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DRIVING CLEANER MOBILITY WITH FUEL ETHERS

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